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Wireless Directory Assistance

Services Market, 2001-2007

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For information regarding permission, write:

Frost & Sullivan
1040 East Brokaw Road
San Jose, CA 95131-2309
United States

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EXECUTIVE SUMMARY

Industry Overview

There are now more than 97 million wireless phone users in the U.S., with roughly 55,000 Americans signing up for new service every day, according to the Cellular Telecommunications Industry Association. By 2003, nearly half of all Americans are expected to own a cellular phone.

What's driving the red-hot growth of wireless handsets?

- Lower pricing
- Greater geographic coverage
- Elimination of roaming fees
- Payment plans that offer air time at 10 cents a minute or less
- More demand for handsets capable of Internet access
- A greater awareness of the safety and security offered by having a cellular phone

Low fees have even led some power users to replace their landline phones with wireless phones. Up until recently, most wireless carriers competed almost exclusively on price. This situation is changing, however, as wireless carriers tout Web access as a key differentiator. Sprint PCS was the first U.S. wireless carrier to heavily advertise its wireless Web strategy, and the other major carriers, such as AT&T, Verizon, and VoiceStream, are rushing to unveil their Internet access programs.

Digital wireless phones are taking over from analog. In 2000, digital handsets in the United States comprised more than 78.5 percent of total sales, and in 2001, digital is projected to have a 95.5 percent market share. All digital phones will soon be enabled to access Web. Applications such as instant messaging and mobile e-commerce (sometimes called m-commerce), which will transform the handset from being a "nice to have" wireless phone to a "must have" information appliance. Advancements in handset technology such as bigger screens, color, holographic displays, voice recognition, and GPS-driven location position functions will propel the market.

The only problem on the horizon is a potential shortage of components. Component manufacturers, especially the semiconductor industry, will be hard-pressed to keep up with demand, especially as dual and triple-mode handsets become the norm.

Directory Assistance Service was the first service offered by all Telecom Operators. Conventionally, human operators provide telephone and/or fax numbers, once a customer has given a city name and proper name, (and if necessary also an address).

It ranks high among the most frequently used services offered by carriers and third party service providers. Generally speaking, the total number of yearly calls to the service in a given country is seven times the total number of people in a country. This seems to hold at least for the European countries.

It is easy to understand that Directory Assistance Services that are completely dependent on human operators are very expensive for Network Operators. Since DA services, despite the present costs, are considered as potentially profitable, cross-subsidy from services which make money now are no longer allowed. Consequently, DA services must become profitable on their own.

Information services such as DA are natural candidates for the use of the Internet. Indeed, operators are recognizing a shift from voice based to Internet based access to the DA service in fixed networks. However, at the same time there is a growing demand for DA (and related) services in mobile networks. Ideally, customers should be able to access DA information any time, anywhere, using any (suitable) type of terminal. Easy access to the Internet based service using mobile phones with small screens and even smaller keyboards is an obvious way for turning a cost center into a profit center. Integration of speech and graphics in the interface of these terminals is considered a necessary requirement for wide spread use of mobile terminals for Internet access. DA services are an obvious vehicle for this research.

Information providers are gearing up to start delivering traffic, weather, and shopping information to wireless phones on top of such basic needs as 911 or directory assistance. The big question, is who will pay the cost of providing this information, and how it will be paid for?

Web content is free, TV is free, and consumers are clearly expressing that they expect to see wireless media sponsored in similar ways.

Welcome to a wireless future where the major applications are new fixed-wireless solutions and voice and high-speed data connectivity from anywhere on earth.

The components of tomorrow include fuel cell-powered, multi-function handsets in touch with almost anything electronic; microscopic chips (called "microelectromechanical systems") embedded in and distributed throughout cars, homes, offices and highways; "last-inch" connectivity over short-range networks; and universal machine-to-machine communications.

Introduction/Definitions/Segmentation

INTRODUCTION

Over the last decade, directory assistance in general has evolved to a great degree. Voice recognition has lowered costs associated with having a person handle every call from beginning to end. While the direct listing DA operators have not been eliminated, the number of calls an individual operator can take has more than doubled. But, direct listing DA services have stiff competition from Internet based DA and voice portal DA. While the listings on these services are less accurate than the databases for most direct listing service providers, it is within the tolerance level for many end users considering that these services are generally free.

According to data provided by one of our sources, in a survey of wireless users, almost 50 percent of all business users have used wireless 411 or voice-mail applications. For the business user, wireless directory assistance (DA) and voice messaging are the top two enhanced wireless services. On the consumer side, roughly one-third of consumers have used wireless directory assistance service and a quarter have used wireless voice mail.

In another important finding, wireless households are viewed to be using enhanced DA both online and over the wireless phone, with online DA "lookups" being even more heavily used than voice mail by wireless consumers with Web access. Consumers are showing us that they can transfer wireless information usage to the Web. DA is the place where wireless and the Web are coming together today.

DEFINITIONS

Directory Assistance (DA)

For the purposes of this report "directory assistance or DA" shall include services where a telephony end user is provided with a listing. Revenues and volume do not include enhanced DA services such as call connection or non-listing services. Only voice telephony DA is accounted for, thus Internet based text DA services (wireless or wireline) is a competitive technology to the wireless DA services in this report. The voice DA can be automated or require all or some of the call to be completed by a live operator.

The rationale for defining DA in this manner is:

- Text based data DA services, while a competitor to voice DA, are substantially different in the means of service delivery and technology needed.

- While other Frost & Sullivan studies have included enhanced services in DA revenues, they are excluded here to contrast DA services with voice portals. If DA enhanced services were included, most of the voice portal services would also have to be included. This would eliminate much of the granularity of the data presented.

Direct Listing DA vs. Voice Portal DA

This study defines "direct listing" as DA calls using 411, 555-1212, or other recognized directory assistance services. The defining characteristic of direct listing DA services, as opposed to voice portal DA services, is that while both have other services available on the service besides listings, direct listing DA's primary service is listings. Voice portal DA is one of many services marketed on the voice portal.

Market Segmentation

Frost & Sullivan has segmented the wireless directory assistance services market into direct listing DA and voice portal DA services. The reason for this segmentation is as follows:

- Both services are voice telephony interfaces and belong in the same study.
- The revenue generation for each service is different.
- Market history and development is different for each service.

"Calls" and "Listing Access"

Traditionally, the DA market has used calls as the volume unit. Listings accessed was somewhat irrelevant due to the variance in the market as to the number of listings a consumer could access in one DA call. For example, some services allow one listing to be accessed for a set price while others, particularly national DA services, allow the caller to access more than one listing per call.

For the purposes of this report:

- Direct Listing DA volume is calculated by call
- Voice Portal DA volume is calculated by listing accessed.

For the purposes of the average number of minutes used to access a listing, calculations have been used to compensate for multiple listing DA "hits." For direct listing calls, an industry average of multiple listing calls was used to extend the average call time over that of the average single listing DA call. For voice portal DA, the average time to access a second listing is less than the first. For the first DA listing, the caller must navigate to the DA portion of the voice portal; for the second she/he does not. This variance has also been calculated into the minute of use model.

Existing DA Services

555-1212.com, the nation's leading Internet directory information provider, has in place a service called Mobile Directory (mobile 555-1212.com) providing users with free services for looking up people, businesses, area codes, and country codes over Internet-enabled PDAs (personal digital assistants) and wireless phones with the fewest keystrokes of any current mobile technology.

Mobile Directory is designed specifically for the constraints of wireless Internet users, making the navigation and data entry significantly more efficient than any other comparable product on the wireless Internet. Frost & Sullivan expects that by the end of 2003, there will be an installed base of 12 million Internet capable PDAs, and 75 million low-end and 3.5 million high-end smart phones in the United States.

Although both the mobile and Internet markets are individually experiencing tremendous growth, mobile data uptake has generally been anemic in the United States. Internet consumers tend to be dominated by less aggressive users of technology. To combat the low adoption rates, which Sprint PCS has pegged at the low double digits, cellular/PCS providers are now targeting the business market, especially the 40 to 45 million "road warriors." Road warriors, however, require access to company networks and email with attachments as well as full web browsing rather than limited-content Internet access through wireless portals. Business users demand increased productivity while on the road and companies building alternative wireless WAN and LAN-based data networks are providing these services. Business users are likely to use their WAP-enabled mobile phones for bursty queries in a mobile mode. However, when they are in portable mode and in "hotspot markets," such as airports, hotels, convention centers, and eventually all areas of the public domain (including coffee shops and restaurants), they are more likely to use their wireless LAN or WAN-enabled laptops or PDAs.

The proliferation of cost-effective and integrated wireless modems in laptops by PC manufacturers such as Dell, Sony, and IBM will further propel the growth of this market. The wireline network still will work just fine, but wireless connectivity will become nearly universal. What's more, there may not be much of a distinction made between which signals travel on a wireline network and which ones traverse a wireless system.

Trends in Directory Assistance

Voice Recognition Will Cut DA Costs While Enabling Enhanced Services

Expanded focus from the early Nortel days of "partial automation"-shaving off seconds of the call, to "full automation"-operator used only for backup. This trend is a direct result of improvements in speech recognition. Full automation has a point of diminishing returns as the frequency distribution curve has such a long tail. At increased levels of automation, the increment in DA associated cost for each increment in automation begins to decline. This suggests that market participants are attaching a greater probability to a sharp increase in speech automation directing the swing of wireless DA technology.

Voice recognition facts:

- Wireless is focused on most frequently requested listings for business because this is 90 percent of wireless DA calls.
- Automated speech recognition is about 1/10th the cost of operator-based DA so wireless ASPs are receiving pressure from carriers to do automation and pass on the savings to them.
- An estimate is that carriers pay upwards of $.50 per call to ASPs and charge subscribers $.75+airtime. ROI on full automation is approximately six months.

Emergence of new value-added, self-serve DA services that use speech recognition in place of hiring costly operators at $30,000 per year. Depending on whether the caller knows what listing they want determines whether information is provided before or after the listing is given. Automation through speech recognition has actually allowed callers to obtain more value from a service.

Revenue Models are Becoming More Creative

Per minute charge for a DA system that lets you stay in it as long as you want incomplete. Advertising sponsored DA where brings the service to you and merchants pay for placement. And last but not least, DA is offered as just one of many voice-driven services in a voice portal that charges a flat-access fee (Qwest and Lycos both charge $4.95 for their voice portal services using speech recognition.)

Voice Portals Will Be Major Market Force in DA

Voice portal services are relatively straightforward to deploy and offer many opportunities to carve out a singular niche in the market. Every service provider wants to be the next Yahoo! or America Online, and voice offers service providers an incredible opportunity to expand their user base and differentiate themselves from their competition. At the same time, existing portal and Web site operators have huge databases and can support telephone applications with minimal investment.

Second, technology has evolved, with ASR in particular making dramatic advances, powered in large measure by huge increases in processing power. Text-to-speech (TTS) technology has also improved. The adoption of a standard voice-scripting language, such as voice extensible markup language (VXML), can be expected to fuel voice portal services, just as hypertext markup language (HTML) fueled development of the Internet. At the same time, the cost of creating a speech-based portal platform continues to decline. Increasing densities and decreasing costs on the voice processing and network interface hardware that form a central part of a voice portal system allow service providers to serve more users at less cost. Finally, the Internet has raised public expectations, with people growing used to having information at their fingertips when they want it. Once people get accustomed to immediate news, weather reports, movie listings, or stock quotes over the Internet, the transition to the phone makes perfect sense.

Total Market

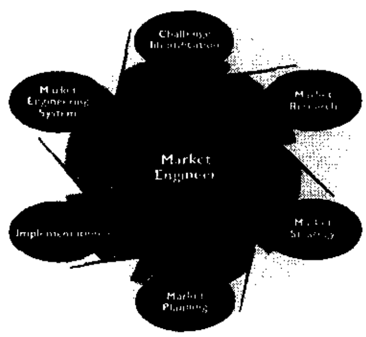
Market Engineering Analysis

Chart 1 presents the Market Engineering Measurements for the U.S. wireless directory assistance services market.

Chart 1

Total Wireless Directory Assistance Services Market: Market Engineering Measurements (U.S.), 2000

Market Engineering Drives Market Strategy and Planning



Measurement Name	Measurement	Trend
Market age	Maturity Stage	---
Revenues	$528.7 million	Increasing
Potential revenues (maximum future market size)	$580.9 million	Decreasing
Base year market growth rate	9.7%	Increasing
Forecast period market growth rate	(0.4)%	Decreasing
Base Year DA Calls/Listing Access	753.8 million	Increasing

Saturation (current/potential users)	45.1%	Increasing
Average per minute price	$0.06	Decreasing
Average direct listing call price	$0.63	Decreasing
Price sensitivity	Medium	Increasing
Competitors (active market competitors in base year)	18	Increasing
Companies entering the market (1998)	7	Increasing
Companies exiting the market (1998)	2	Stable
Degree of competition	6	Increasing
Degree of technical change	High	Increasing
Customer satisfaction	5	Stable
Customer loyalty	4	Decreasing

Source: Frost & Sullivan

Market Age

Directory assistance, in general, is a mature market. With voice portal and wireless both in development stages, it could be argued that the U.S. wireless DA market should also be classified as in development stage. But the market is exhibiting more factors that indicate the market is a mature market going through changes. Some indications of maturity include:

- Leveling off of revenue growth
- Established consumer base
- Price stability
- Revenues

In the base year (2000), the revenues for the total U.S. wireless DA services market was $528.7 million. Revenues are from direct listing DA access and minute revenue charges for both direct listing and voice portal DA services.

Potential Revenues

The maximum total market revenues for the total wireless DA market are expected to occur in 2002 at $580.9 million. From that point to the end of the forecast period (2007) market revenue will be in a slight decline.

Base Year Market Growth Rate

The growth rate for the base year (2000) was 9.7 percent. This was an increase from the 8.4 percent growth rate in 1999.

Forecast Period Market Growth Rate

The compound annual growth rate for the forecast period (2000-2007) is projected to be negative 0.4 percent. This represents some loss in the market toward the latter part of the forecast.

Base Year DA Calls/Listing Access

In 2000, there were 753.8 million wireless DA listings accessed or calls in 2000.

Saturation

Currently the market is at 45.1 percent of total potential calls and/or listings accessed.

Average Price Per Minute

The average price per minute for wireless DA calling in 2000 was $0.06. This is taking the calling plans and DA calling patterns into account.

Average Direct Listing Call Price

The average price for direct listing access in 2000 was $0.63. This includes national and local DA services.

Price Sensitivity

Price sensitivity is rated medium in the market. Compared to many telecom services, the price sensitivity in this market is almost non existent for many wireless consumers but has increased over the last two years. This is likely to continue as many of voice portals add free DA service.

Competitors

There were 18 active market competitors in the base year. This does not include call centers and DA wholesale providers.

Companies Entering the Market

There were seven new entrants to the wireless DA market in 2000. The vast majority of these were voice portal companies that offer DA services. Most, if not all, of the growth in number of market participants are expected to be from the voice portal market segment.

Companies Exiting the Market

Two companies left the market in 2000. This was due to consolidation and acquisition. For example, Quack and AOL have joined forces on the retail side of voice portal services.

Degree of Competition

Competition in the wireless DA market is given a 6 on a scale of 1 to 10, with 10 being high competition. With voice portal DA entering the voice access wireless DA market, it is more competitive than it has been in a number of years.

Degree of Technical Change

The degree of technical change is high for the wireless DA market. This comes primarily from voice recognition and data retrieval changes.

Customer Satisfaction

Customer satisfaction is given a 5 on a scale of 1 to 10, 10 being highest. While most DA calls are completed with little or no problems for the customer, listings for many services have increasingly inaccurate than in the past. This is due to the CLECs not reporting listings in a timely manner and no reporting of wireless phones at all.

Customer Loyalty

Customer loyalty is rated a 4 (1 to 10) and is decreasing. The reasons for this include increased choices in the market, price competition, and increased competitive marketing.

Drivers

Figure 1 provides a list of market drivers for the wireless directory assistance services market.

FIGURE 1

Total Wireless Directory Assistance Services Market: Market Drivers (U.S.), 2001-2007

Rank	Driver	1-2 years	3-4 years	5-7 years
1	Ease of Use From Transient locations.	High	High	High
2	Higher service Price	High	Medium	Medium
3	Enhanced Service	Medium	High	High
4	Outsourcing Wireless DA	Medium	Medium	Medium
5	Advent of Prepaid Cellular	Medium	Low	Low

Source: Frost & Sullivan

Unavailability of Alternative DA Sources

To a large extent, the limited access to alternative directory sources such as published directories is promoting the use of wireless directory assistance among end users. DA combined with call completion services offers convenience to the mobile users in circumstances where they have no access to alternative directory sources or are unable to lookup the phone book for listings.

Higher Service Price

Wireless DA services are priced much higher than the wireline DA and hence enable service providers to generate higher revenue. The high margins on wireless DA services are enticing an increasing number of competitors to foray into wireless DA thereby resulting in market expansion.

Enhanced Services

In addition to number listings, wireless DA providers are also beginning to offer enhanced DA services such as movie listings, stock quotes, etc. to wireless DA users. These services are definite value adds and hence may result in expanded DA usage.

Outsourcing of Wireless DA

An increasing number of wireless providers are outsourcing their DA service from the local carriers as well as from third party providers. This trend has contributed toward the increase in DA revenue for such providers. Outsourcing allows operational efficiency and hence, is gaining popularity among carriers.

Introduction of Prepaid Cellular Attracts New Users

The growth of prepaid cellular is attracting a new segment of wireless users who were previously unable to use the cellular service due to its stringent credit requirements. This increasing penetration also has had a positive impact on wireless DA revenues as these users make use of DA services to obtain individual and business listings.

Restraints

Figure 2 provides a list of market restraints for the wireless directory assistance markets.

Figure 2

Total Wireless Directory Assistance Services Market: Market Restraints (U.S.), 2001-2007

Rank	Restraint	1-2 years	3-4 years	5-7 years
1	Alternative Wireless DA Sources Through Voice and Text Data Portals	High	High	High
2	High Cost of Wireless Infrastructure	High	High	High
3	Fewer wholesale DA offerings	High	Medium	Medium
4	High Service Cost	Medium	Medium	Medium
5	Data Accuracy	Medium	Medium	Low
6	Multiple dialing patterns	Medium	Low	Low
7	Online DA competition	Low	Low	Low

Source: Frost & Sullivan

Casual Wireless Usage

The penetration of cellular in the consumer market while increasing subscriber base has reduced the overall average revenue per user (ARPU). Some of the reasons behind the decline in ARPU include the growth in safety users, increase in competition which has led to a reduction in pricing, and the growth in off-peak users. This also has a negative impact on the use of wireless directory services as the casual users make limited use of their cellular/PCS phones.

High Cost of Wireless Infrastructure

The high cost of infrastructure deployment is restricting the entry of new players in the wireless market. The lack of new firms entering the market is limiting wireless penetration and hence is also having a negative impact on the use of wireless DA services.

Fewer Wholesale DA Offerings Impede Market Development

Wholesale wireless DA is offered by a limited number of service providers, a majority of which is comprised of third party providers. A number of the RBOCs while offering DA to their retail wireless customers, do not provide the service to resellers. One reason behind that is the fact that wholesale DA contains very slim margins and a majority of the carriers have opted to stay out of the wholesale wireless market due to this reason.

High Cost of Service

The overall cost of wireless directory assistance is much higher as compared to that of the wireline service. This is because wireless users not only pay for the directory assistance call but also for the air time used in making that call. In other words, the overall cost for wireless directory assistance can be twice as high as the wireline call. The higher wireless directory assistance charges inhibit the use of the service among end users.

Data Accuracy

Wireless providers constitute one of the largest outsourced segments for DA services. They outsource DA mainly from third party providers as it ensures lower cost. The third party data, however, may lack the highest level of accuracy attached with the RBOC's databases and may result in the provisioning of inaccurate information to the callers which in turn will result in the curbed usage of the service in future.

Multiple Dialing Patterns

Unlike the wireline DA, wireless DA utilizes several different dialing patterns. This is due to the reason that different wireless providers offer separate dialing patterns for accessing directory assistance on cellular or PCS phones. The use of several different dialing patterns creates confusion on part of the customer and hence restricts usage. Add to this the fact that calls get routed to different service providers depending on the dialing pattern used can result in a difference in service quality as well.

Competition from Online DA Providers

The growth of Internet among U.S. business and residential customers is having a strong impact on the wireless DA market in the sense that an increasing number of service providers including the RBOCs are offering free online directory assistance services to their customers. The Internet DA market is expected to expand thereby creating competitive threats for the wireless providers.

Revenue Forecast

Figure 3 presents the revenue forecast for wireless minute use in the directory assistance services market.

FIGURE 3

Total Wireless Directory Assistance Services Market: Total Minute Usage Revenues (U.S.) 1997-2007

Year	VPDA Revenues ($ Million)	DLDA Revenues ($ Million)	Total Market Minute Revenues ($ Million)	Total Revenue Growth Rate (%)
1997	---	56.1	56.1	
1998	---	54.7	54.7	(2.5)
1999	---	53.9	53.9	(1.5)
2000	0.2	54.4	54.6	1.3
2001	7.6	54.5	62.1	13.7
2002	18.2	52.4	70.6	13.7
2003	34.1	47.2	81.3	15.2
2004	46.4	42.9	89.3	9.8
2005	65.1	36.3	101.4	13.6
2006	77.7	31.3	109.0	7.5
2007	89.6	28.9	118.5	8.7

Compound Annual Growth Rate (2000-2007): 11.71

Legend: VPDA – Voice Portal Directory Assistance, DLDA – Direct Listing Directory Assistance

Note: All figures are rounded; the base year is 2000. Source: Frost & Sullivan

The revenue generated from minute usage to access voice portal and direct listing DA is expected to grow at a healthy 11.7 percent compound annual growth rate. This growth will be achieved despite a substantial price per minute for wireless use over the same period (see total market, price forecast). The major increase in minute revenue will come from voice portal DA access time as voice portals become more popular with wireless subscribers.

In the base year (2000), minute use DA revenue was $54.6 million. Of this, only 0.36 percent ($200,000) was the result of voice portal DA access time. This will increase dramatically however due to two factors:

- Increasing wireless subscriber use of voice portals
- Longer access time than direct listing DA

By 2002, voice portal DA minute access revenue is expected to represent 25.8 percent of the total market. In the last year of the forecast (2007), this will increase to 75.6 percent of the total market.

Figure 4 presents the total market revenue for the wireless directory assistance services market. This includes minute use revenue for voice portal DA and direct listing DA, in addition to the revenue from direct listing DA access. No revenue from voice portal access is accounted for in this report due to the uncertainty of the voice portal revenue model and difficulty in assigning revenue specifically to DA access.

FIGURE 4

Total Wireless Directory Assistance Services Market: Total Market Revenues (U.S.), 1997-2007

Year	VPDA Revenues ($ Million)	Total DLDA Revenues ($ Million)	Total Revenues ($ Million)	Total Revenue Growth Rate (%)
1997	---	415.2	415.2	---
1998	---	444.7	444.7	7.1
1999	---	482.1	482.1	8.4
2000	0.2	528.5	528.7	9.7
2001	7.6	551.4	559.0	5.7
2002	18.2	562.7	580.9	3.9
2003	34.1	544.1	578.2	(0.5)
2004	46.4	531.7	536.1	(7.3)
2005	65.1	483.5	548.6	2.33
2006	77.7	444.2	521.9	(4.9)
2007	89.6	424.8	514.4	(1.4)

Compound Annual Growth Rate (2000-2007): (0.4)%

Legend: VPDA – Voice Portal Directory Assistance, DLDA – Direct Listing Directory Assistance

Note: All figures are rounded; the base year is 2000. Source: Frost & Sullivan

In the base year (2000) the total market was $528.7 million. The vast majority of this came from listing access fees charged by direct listing DA services. The growth for the market is expected to be flat, at a negative 0.4 percent over the forecast period. While the number of subscribers accessing DA services is expected to increase, voice portal DA will increase market share. Because voice portal DA is "free" to the end user, this limits the potential revenue growth in the total market.

Demand Trends

Figure 5 presents the demand forecast for the total U.S. wireless directory assistance services market.

FIGURE 5

Total Wireless Directory Assistance Services Market: Total Volume of Directory Assistance Calls/Listing Access (U.S.), 1997-2007

Year	DA Calls/Listings (Million)	Growth Rate (%)
1997	543.1	---
1998	600.0	10.5
1999	669.5	11.6
2000	753.8	12.6
2001	853.3	13.2
2002	971.1	13.8
2003	1096.2	12.9
2004	1232.9	12.5
2005	1375.3	11.6
2006	1519.7	10.5
2007	1671.7	10.0
Compound Annual Growth Rate (2000-2007): 12.1%		

Note: All figures are rounded; the base year is 2000. Source: Frost & Sullivan

The total market demand for wireless directory assistance is expected to have a brisk growth of 12.1 percent from the base year (2000) to 2007. This is due to several factors, including:

- Increased penetration of wireless telephony
- Trend toward transient use of telephony
- Decreased consumer use patterns toward printed listing
- DA services included in bundled voice portal offerings

In the base year (2000) total U.S. wireless DA call volume was 753.8 million, which was up 12.6 percent from 1999. By 2003, the market volume is expected to break 1 billion calls or listing accesses. Growth in volume will then be driven by voice portal DA access and reach approximately 1.7 billion listings accessed by 2007.

